DEFLATION OF SOFTWARE IN THE NATIONAL ACCOUNTS

Recommendations of the OECD Task Force on the measurement of software in the national accounts

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Present situation

- Genuine price indices are not available

- Some countries use BLS index (corrected by changes of exchange rates), which goes down. Hardware price index is sometimes used as reference which also goes down. At the other extreme, countries use deflators that are not directly related to software - those indices tend to go up.

- Result: there is a huge incomparability between countries. Only the indices used by US and Canada are closely comparable.

Investment in software. Price indices in recent years. 1995=100
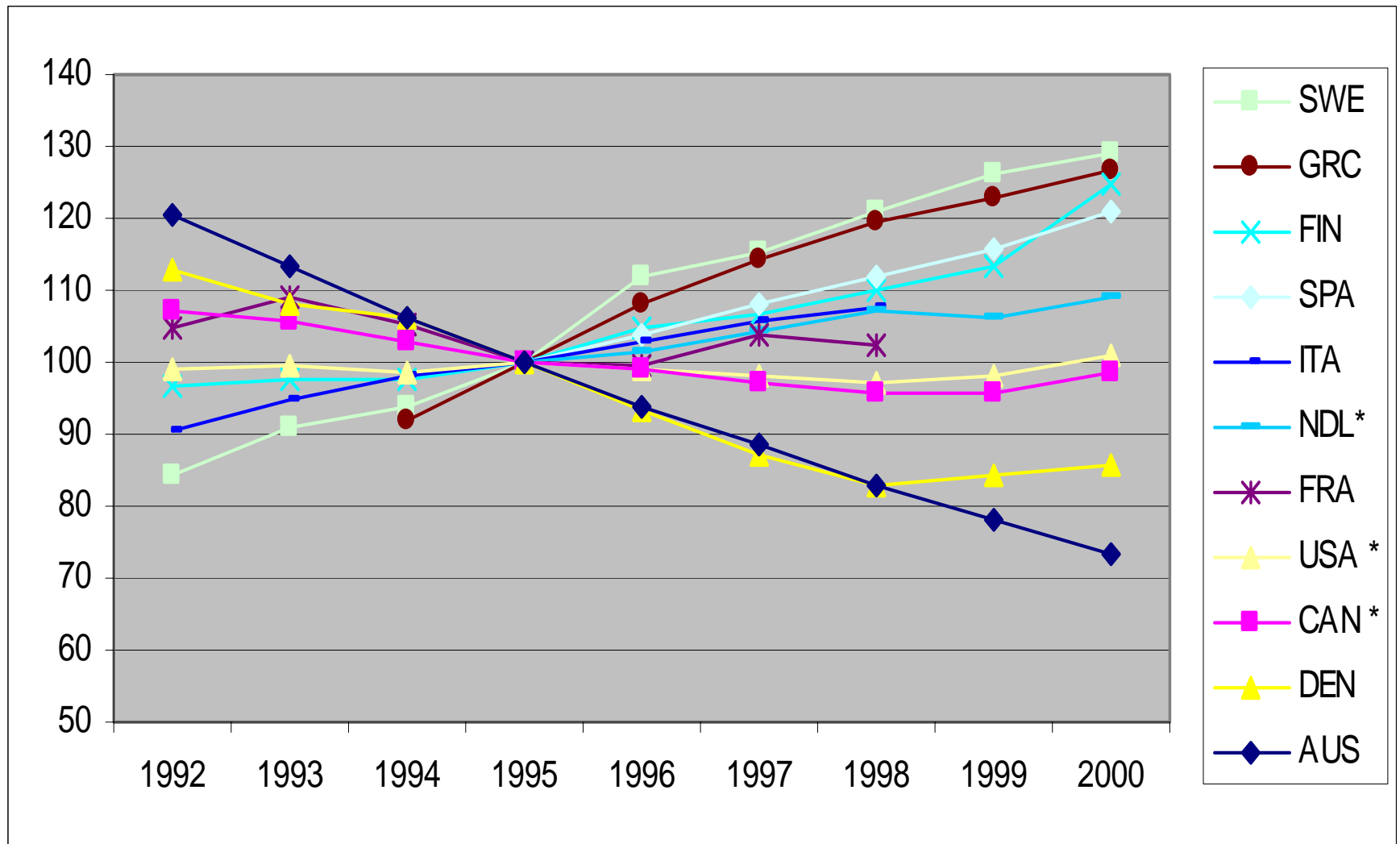
Share of software expenditure by type to total software expenditures in Canada
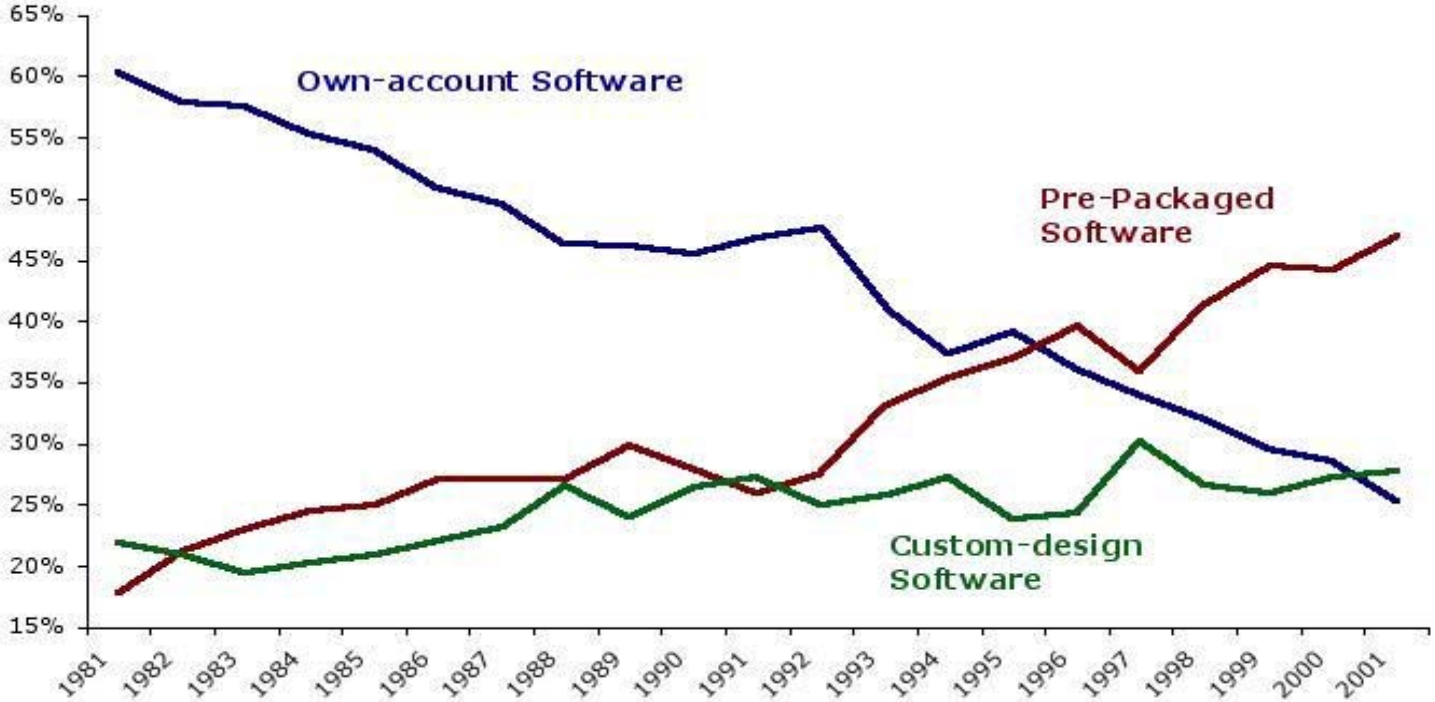
Recommendation 1

- Price indices should be available separately for the pre-packaged, customised and own-account software to take into account their different price development and changing shares in software expenditure.

Recommendation 2

Pre-packaged software - deflation <u>in the long term</u>:

- Price indices should be developed covering business and household (including games) software that adequately into account qualitative changes of software.

- In practice, such price indices might still be biased and adjustments are needed. If that is the case, adjustments should be based on available objective data and made transparent to users. Improvement of the comparability with other countries is an important criterion in the adjustment procedure.

Pre-packaged software indices in US; percentage change

	Hedonic	Matched model	Pre-packaged
1986	-15.0	-10.7	-12.8
1987	-9.6	-2.3	-6.0
1988	-21.2	-0.9	-11.0
1989	-31.3	-2.1	-11.7
1990	-22.7	-2.9	-12.8
1991	-10.2	0.4	-4.9
1992	-31.9	-7.8	-19.8
1993	-7.5	-2.0	-4.7
1994		-5.4	-8.6
1995		-2.2	-5.4
1996		-2.5	-5.7
1997		-5.2	-8.4
1998		-5.0	-8.1

Recommendation 3

Pre-packaged software - deflation <u>in the short term</u>:

- It is better to use the US price index for **imported** pre-packaged software rather than to use deflators that are not directly related to software. The index should be adjusted on the basis of changes in exchange rates and it should reflect different timings of releases of new software in the US and in a country.

- For time being, the US price index (incl. exchange rate adjustment) can be used also for **domestic** production. It should be adjusted by the relative inflation rate between a country and US (preferably PPI for a country vis-à-vis PPI for US).

Recommendation 4

Deflation of customised software:

- **In the long term** price indices might be possible to develop although it is not easy to establish an index that is based on representative set of products and take into account quality development.

- **For the time being** (until 2005) an index based on averaging pre-packaged software index and input-cost index might be appropriate. If output and expenditure data are available by detailed classification, it could be considered to use different weights depending to what extent the services concerned can be produced on an own-account basis.

Recommendation 5

Deflation of own-account software:

- **In the long term**, when price indices for customised software become available, they can be used for own-account software services. Input-price indices should not be used.

- **For the time being** (until 2005), input-price indices can be used that are based on salary indices without any mechanical productivity adjustments, and adequate indices for intermediate consumption. Software originals can be deflated by the price index for pre-packaged software.